
Request Validation Web Service

Users Guide

USGS / EROS

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Revision Sheet

Release No.	Date	Revision Description
	07/29/2009	Original
Rev. 1	11/04/2009	Added example graphics
Rev. 2	01/11/2010	1. Modification to thumbnail url format. 2. New Tiled example.
Rev. 3	02/22/2010	Eliminated Chunk Size requirement for Tiled requests.
Rev. 4	04/26/2010	Added optional JSON output.

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1 GENERAL INFORMATION

1.1 Introduction

The USGS Seamless and Tiled Server functionality has recently been expanded to provide a set of webservices to the developer that can be incorporated into custom applications. This document discusses how to use the Inventory web service to obtain dataset information the USGS Seamless and Tiled Server data holdings. There are two additional web services that can be used to obtain the full resolution data.

Inventory Service. This is a data discovery service. This service will provide information about what data is available over a particular area of interest. The addition of new datasets and demotion of older datasets from on-line systems to near-line systems is an ongoing process. Updates to the Inventory Service occur on a monthly basis. Efforts are currently underway to include in the Inventory Service all of the datasets currently available through the USGS Seamless Server.

Request Validation Service. Utilizing dataset information obtained from the previous call to the Inventory Service and a user-defined area of interest, this service verifies and validates the information, and then returns to the user fully parameterized URL(s) that can be used by the Download Service.

Download Service. This service initiates a request for data, queries the system to obtain a job status, and returns the requested data to the user.

Orthoimagery data that is no longer considered the “best available” is removed from on-line systems and map services on a periodic basis. When this occurs, the dataset is clipped into pre-packaged zipfiles and stored on near-line systems so that it can still be obtained by the public. These datasets currently show up in the Inventory Service with a STATUS = Tiled.

1.2 Organization of the Manual

Section 1 provides a general description of the system.

Section 2 provides a description of the Request Validation Web Service.

1.3 Acronyms and Abbreviations

Acronym	Definition
WMS	Web Map Service
SDDS	Seamless Data Distribution Server
TDDS	Tiled Data Distribution Server
WSDL	Web Service Description Language

2 REQUEST VALIDATION WEB SERVICE

2.1 Overview

The Request Validation Service performs the following tasks:

- a. It verifies that the total area of interest is of a reasonable size. For instance, if you were to submit to the Download Service the bounding coordinates for the entire contiguous U.S. you would receive an error because that area would exceed the service limit of 1.5 gigabytes of estimated data. This is to prevent the service from creating an unmanageable number of download and thumbnail URLs at one time. There is no limit as to the number of times a user can call the Request Validation web service, but the size of each request is limited so that the service does not waste time building URLs that may never actually be used.
- b. The service also breaks up the area of interest into more manageable pieces for downloading and usability purposes. A 1.5 gigabyte file would take quite awhile to download and may be too large to load into a client application, so the area of interest is broken up into equal size pieces between 15 and 250 megabytes. Each resulting piece must be requested and downloaded separately when retrieving the data.
- c. The service validates that the product key, output format, metadata format and compression format are valid combinations for a particular dataset.

The URL to the Request Validation Service WSDL page is:

<http://extract.cr.usgs.gov/requestValidationService/wsdl/RequestValidationService.wsdl>

2.2 Notes on Request Limits

The maximum size of an individual Seamless download is currently set at 250 MB. You can request smaller pieces by using the “CHUNK_SIZE” parameter in the processAOI method. Requests larger than the desired chunk size will be recursively subdivided until each piece is less than the chunk size. You can estimate the size of your request (in MB) by multiplying the area (in square degrees) of your area of interest by the mbsqdeg value (obtained from the Inventory Service) per dataset/output format combination. Requests for tiled (pre-packaged) datasets do not utilize the CHUNK_SIZE parameter since the download bundles are already created and sitting on near-line systems.

There is also a limit as to the total size (in MB) that is allowed by the processAOI method. If the estimated size (in MB) for all products combined is greater than 1.5 GB, then you will be returned an error message. You can prevent this from occurring by estimating the total size as shown in the previous paragraph before submitting your processAOI request. The reason for this limitation is simply to prevent an extremely large and unmanageable number of links being returned by the processAOI method at one time.

2.3 Error Messages

This example shows the xml tags that will be used when returning any error from this webservice:

```
<ERROR>
  <FIELD_NAME>Udaoi</FIELD_NAME>
    <ERROR_MSG>User defined area of interest great than max allowed:
26366.855377122745 vs 1500.0</ERROR_MSG>
</ERROR>
```

This example shows the JSON string that will be used when returning any error from this webservice:

```
{"REQUEST_SERVICE_RESPONSE":{"ERROR":
{"FIELD_NAME":"Udaoi","ERROR_MSG":"User defined area of interest greater than max
allowed: 276847.13340001047 vs 1500.0"},"STATUS":false}}
```

2.4 processAOI

This is the method in the Request Validation Service that must be used. The processAOI method only takes one parameter but this parameter must be an xml formatted string like this:

```
<REQUEST_SERVICE_INPUT>
  <AOI_GEOMETRY>
    <EXTENT>
      <TOP></TOP>
      <BOTTOM></BOTTOM>
      <LEFT></LEFT>
      <RIGHT></RIGHT>
    </EXTENT>
    <SPATIALREFERENCE_WKID/>
  </AOI_GEOMETRY>
  <LAYER_INFORMATION>
    <LAYER_IDS> </LAYER_IDS>
  </LAYER_INFORMATION>
  <CHUNK_SIZE></CHUNK_SIZE>
  <ORIGINATOR/>
  <JSON></JSON>
</REQUEST_SERVICE_INPUT>
```

2.5 Sample Java code for calling the processAOI() Method

```
String validationServiceEndpoint =
    "http://extract.cr.usgs.gov/requestValidationService/services/RequestValidationService";
String validationServiceMethod = "processAOI";
String xmlRequestString = "<REQUEST_SERVICE_INPUT> +
<AOI_GEOMETRY> +
    <EXTENT> +
        <TOP> 39.614</TOP> +
            <BOTTOM>39.426</BOTTOM> +
            <LEFT>-76.799</LEFT> +
            <RIGHT>-76.586</RIGHT> +
        </EXTENT> +
    <SPATIALREFERENCE_WKID/> +
</AOI_GEOMETRY> +
<LAYER_INFORMATION> +
    <LAYER_IDS> N1802XT </LAYER_IDS> +
</LAYER_INFORMATION> +
<CHUNK_SIZE>250 </CHUNK_SIZE> +
<ORIGINATOR/> +
<JSON>false</JSON> +
</REQUEST_SERVICE_INPUT>

// Make request
try {
    Service validationService = new org.apache.axis.client.Service();
    Call validationCall = (Call) validationService.createCall();
    validationCall.setTargetEndpointAddress(new java.net.URL(validationServiceEndpoint));
    validationCall.setOperationName( new QName("http://edc.usgs.gov",
                                              validationServiceMethod) );
    String serviceResponse = (String) validationCall.invoke( new Object[] {new
String(xmlRequestString)} );
} catch (Exception e) {
    System.out.println("Error calling ValidationService: " + e.toString());
}

// Process serviceResponse here
```

2.6 Sample Python code for calling the processAOI() Method

```
wsdlUrlValidationService =  
'http://extract.cr.usgs.gov/requestValidationService/wsdl/RequestValidationService.wsdl'  
  
try:  
    #Query the Validation Service  
    server = ServiceProxy(wsdl=wsdlUrlValidationService)  
  
    xmlRequestString =  
"<REQUEST_SERVICE_INPUT><AOI_GEOMETRY><EXTENT><TOP>39.614</TOP><BO  
TTOM>39.426</BOTTOM><LEFT>-76.799</LEFT><RIGHT>-  
76.586</RIGHT></EXTENT><SPATIALREFERENCE_WKID/></AOI_GEOMETRY><LAY  
ER_INFORMATION><LAYER_IDS>N1802XT</LAYER_IDS></LAYER_INFORMATION>  
<CHUNK_SIZE>250</CHUNK_SIZE><JSON></JSON></REQUEST_SERVICE_INPUT>"  
    processAOIResponseDict = server.processAOI(requestInfoXml=xmlRequestString)  
    processAOIResponse = processAOIResponseDict['serviceResponse']  
  
except:  
    processAOIResponse = ""  
    #raise  
  
# Process processAOIResponse here
```

2.7 LAYER_ID Tag Description

Notice in the input xml string that must be submitted to the processAOI method that there is a tag called “LAYER_ID”. This section describes how to construct this string.

For seamless download requests (STATUS=Seamless), the data is clipped in real time and the download bundle is constructed per the user’s desired options. Therefore, the LAYER_ID string must be constructed based on the desired output format, metadata format, and file compression method. Once we’ve decided on which formats we want the data returned to us, we append those codes onto the end of the productkey.

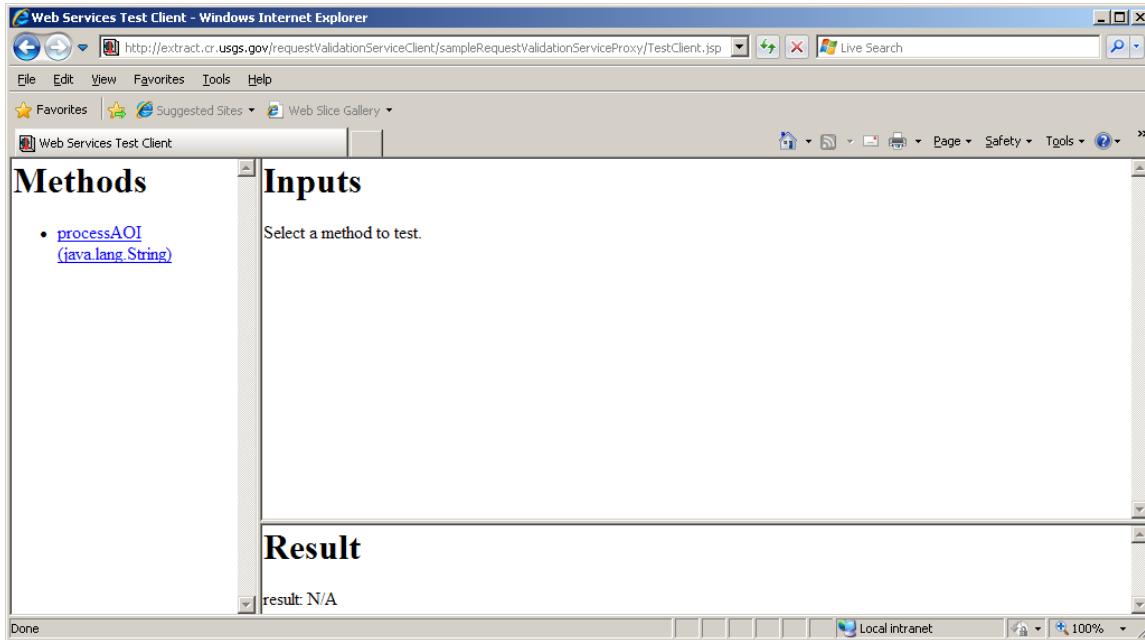
For example, if we want to download NAIP UTM Zone 18N (N18) in GeoTiff (02) format and the metadata in xml (X) format, compressed in a zip (Z) file our string would look like N1802XZ. The order is: productkey (always 3 char), output format (always 2 char), metadata format (always 1 char), and file compression format (always 1 char). Therefore, we would use **N1802XZ** for the LAYER_ID string: <LAYER_IDS>N1802XZ</LAYER_IDS>

For tiled download requests (STATUS=Tiled), the data has been pre-packaged into existing download bundles and must simply be retrieved. In this case, the string used in the LAYER_ID would be constructed with only the productkey such as:
<LAYER_IDS>HOIT</LAYER_IDS>.

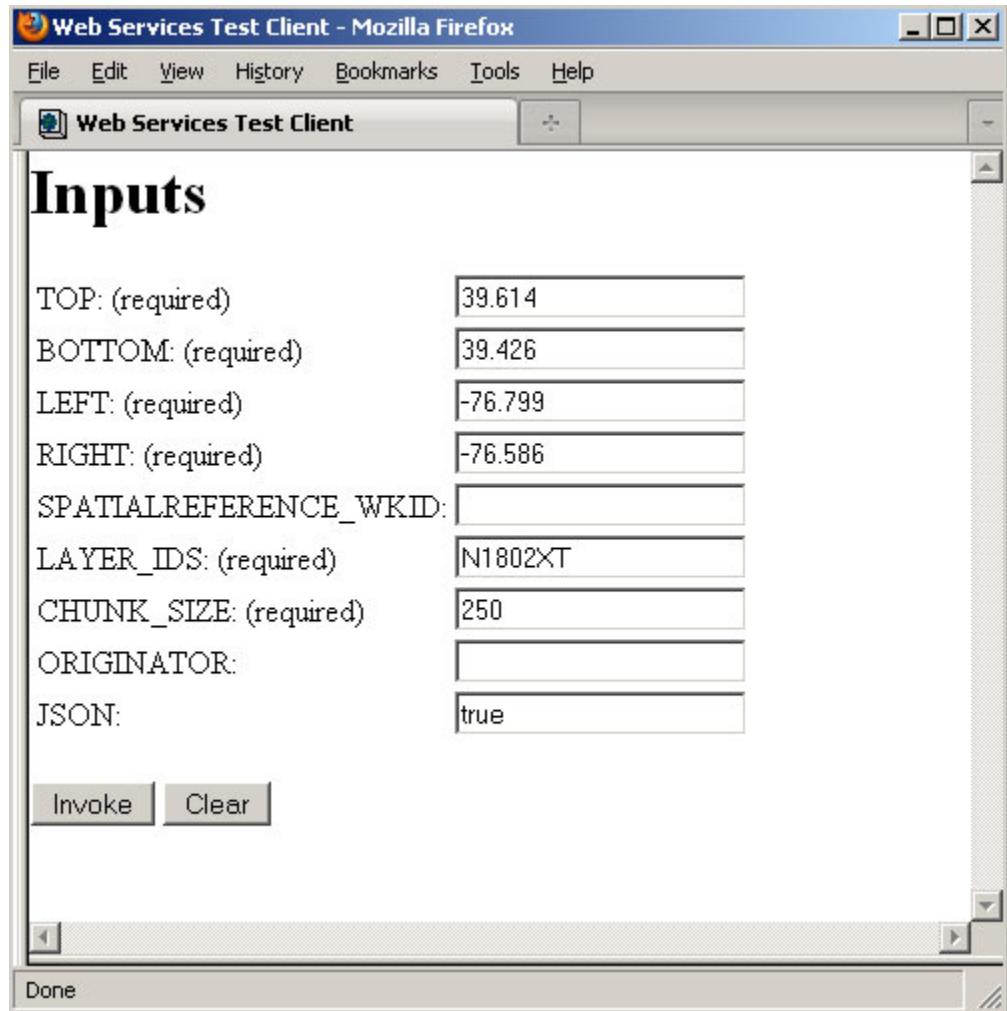
2.8 RequestValidationService Test Client

You can observe the operation of the RequestValidationService by using a test client that we have developed:

<http://extract.cr.usgs.gov/requestValidationServiceClient/sampleRequestValidationServiceProxy/TestClient.jsp>



Click on the [processAOI\(java.lang.String\)](#) link in the Methods frame. Enter data into the required fields of the Inputs frame:



The screenshot shows a Mozilla Firefox window titled "Web Services Test Client - Mozilla Firefox". The title bar includes standard menu options: File, Edit, View, History, Bookmarks, Tools, and Help. Below the title bar is a toolbar with a "Web Services Test Client" icon and a "+" button. The main content area is titled "Inputs". It contains several input fields for the "processAOI" method:

TOP: (required)	39.614
BOTTOM: (required)	39.426
LEFT: (required)	-76.799
RIGHT: (required)	-76.586
SPATIALREFERENCE_WKID:	
LAYER_IDS: (required)	N1802XT
CHUNK_SIZE: (required)	250
ORIGINATOR:	
JSON:	true

At the bottom left of the input frame are two buttons: "Invoke" and "Clear". At the bottom right is a scroll bar. The status bar at the bottom of the window displays the word "Done".

Valid values for CHUNK_SIZE are 15, 25, 50, 75, 100 or 250 megabytes. The smaller the number, the more pieces you will have to download to obtain the entire area of interest.

SPATIALREFERENCE_WKID indicates what projection the input coordinates are in. It defaults to 4326 (Geographic WGS84). If the coordinates were in some other projection such as polar coordinate then you'd want to put the correct code in this field.

ORIGINATOR is a client indicator. It is an optional mechanism that allows USGS to prioritize certain download requests. A valid entry can be worked out between USGS EROS and certain users when necessary as conditions dictate.

JSON indicates whether the client would like the response as XML or JSON. A value of TRUE will return a JSON string, all other values will return XML.

2.9 requestValidationService Output for Seamless Request

The output from the Request Validation Service is one or more “pieces”, each piece consisting of a Download_URL that is used to initiate the download for that piece of data and an associated Thumbnail_URL if you want to display a small preview image in your application.

This shows two of the individual pieces received back from the RequestValidationService using the example request from section 2.8:

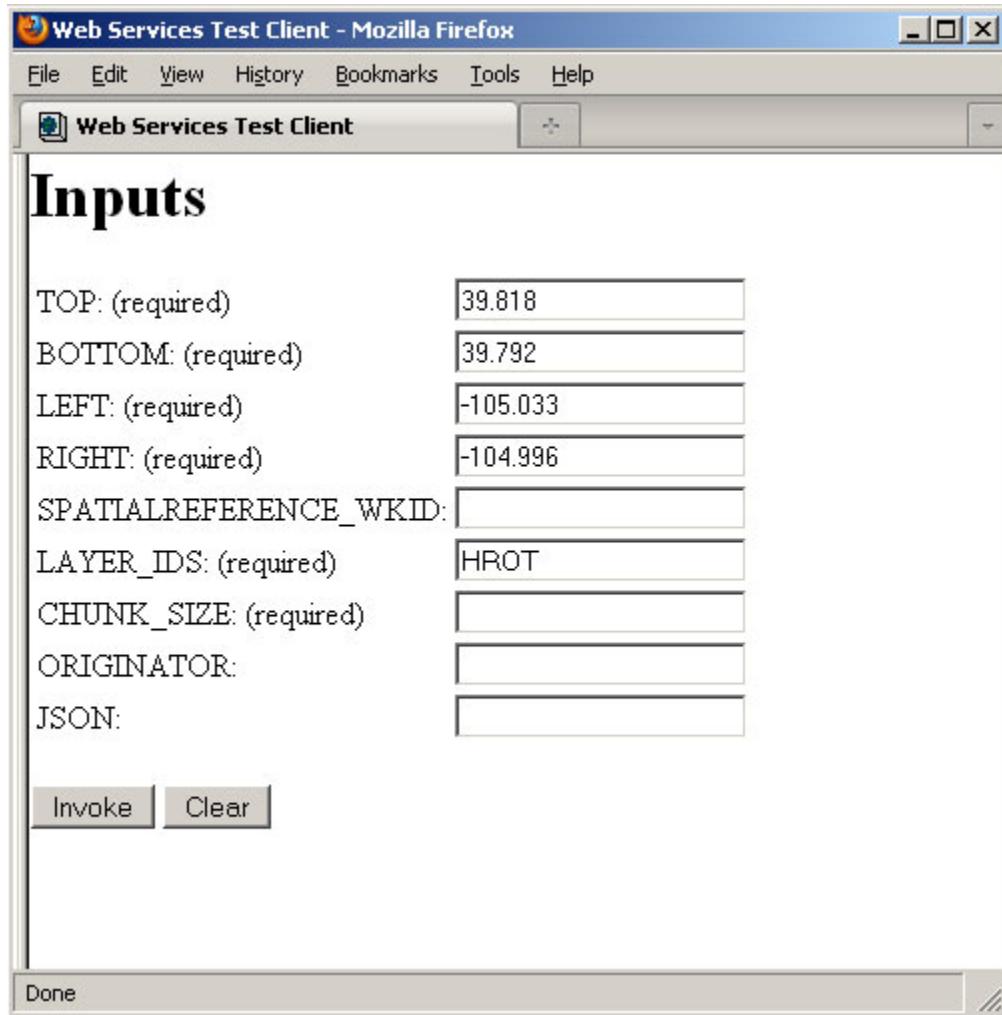
```
<REQUEST_SERVICE_RESPONSE>
<PIECE>
<DOWNLOAD_URL>http://extract.cr.usgs.gov/axis2/services/DownloadService/initiateDownload?
siz=172&key=N18&ras=1&pfm=GeoTIFF&imsurl=-1&ms=-1&att=-1&lay=-1&fid=-1&dlpre=&lft=-
76.799&rgt=-
76.6925&top=39.614&bot=39.55133333333333&wmd=1&mur=http://extract.cr.usgs.gov/distmeta/servl
et/gov.usgs.edc.MetaBuilder&mcd=NAIP_Z18&mdf=HTML&arc=ZIP&sde=NAIP_WGS84_WM_3BAND&msd
=NAIP.naip_z18_plygn_meta&zun=null&prj=26918&rsp=0&bnd=&bndnm=&csx=1.0&csy=1.0&ics=&ORIG
G=null</DOWNLOAD_URL>
<THUMBNAIL_URL>http://isse.cr.usgs.gov/ArcGIS/services/Combined/SDDS_Imagery/MapServer/
WMSServer?servicename=&Version=1.1.1&SERVICE=WMS&request=map&layers=0&bbox=-
76.799,39.551333333333,-
76.6925,39.614&reaspect=false&width=40&height=23&format=jpeg&SRS=EPSG:4326&styles=</THU
MBNAIL_URL>
</PIECE>
<PIECE>
<DOWNLOAD_URL>http://extract.cr.usgs.gov/axis2/services/DownloadService/initiateDownload?
siz=172&key=N18&ras=1&pfm=GeoTIFF&imsurl=-1&ms=-1&att=-1&lay=-1&fid=-1&dlpre=&lft=-
76.6925&rgt=-
76.586&top=39.614&bot=39.55133333333333&wmd=1&mur=http://extract.cr.usgs.gov/distmeta/servl
et/gov.usgs.edc.MetaBuilder&mcd=NAIP_Z18&mdf=HTML&arc=ZIP&sde=NAIP_WGS84_WM_3BAND&msd
=NAIP.naip_z18_plygn_meta&zun=null&prj=26918&rsp=0&bnd=&bndnm=&csx=1.0&csy=1.0&ics=&ORIG
=null</DOWNLOAD_URL>
<THUMBNAIL_URL>http://isse.cr.usgs.gov/ArcGIS/services/Combined/SDDS_Imagery/MapServer/
WMSServer?servicename=&Version=1.1.1&SERVICE=WMS&request=map&layers=0&bbox=-
76.6925,39.551333333333,-
76.586,39.614&reaspect=false&width=40&height=23&format=jpeg&SRS=EPSG:4326&styles=</THUM
BNAIL_URL>
</PIECE>
...
<REQUEST_SERVICE_RESPONSE>
```

This example shows the same pieces received back in JSON format:

```
{"REQUEST_SERVICE_RESPONSE":  
  {"PIECE":  
    [  
      {"THUMBNAIL_URL": "http://isse.cr.usgs.gov/ArcGIS/services/Combined/SDDS_Imagery/MapServer/WMServer?  
        servicename=&Version=1.1.1&SERVICE=WMS&request=map&layers=0&bbox=-76.799,39.551333333333,-  
        76.6925,39.614&reaspect=false&width=40&height=23&format=jpeg&SRS=EPSG:4326&styles=",  
      "DOWNLOAD_URL": "http://extract.cr.usgs.gov/axis2/services/DownloadService/initiateDo  
        wnload?siz=172&key=N18&ras=1&pfm=GeoTIFF&imsurl=-1&ms=-1&att=-1&lay=-1&fid=-  
        1&dlpre=&lft=-76.799&rgt=-  
        76.6925&top=39.614&bot=39.551333333333&wmd=1&mur=http://extract.cr.usgs.gov/distm  
        eta/servlet/gov.usgs.edc.MetaBuilder&mcd=NAIP_Z18&mdf=HTML&arc=ZIP&sde=NAIP_WGS84_  
        WM_3BAND&msd=NAIP.naip_z18_plygn_meta&zun=null&prj=26918&rsp=0&bnd=&bndnm=&csx  
        =1.0&csy=1.0&ics=&ORIG=null"},  
      {"THUMBNAIL_URL": "http://isse.cr.usgs.gov/ArcGIS/services/Combined/SDDS_Imagery/MapServer/WMServer?  
        servicename=&Version=1.1.1&SERVICE=WMS&request=map&layers=0&bbox=-  
        76.6925,39.551333333333,-  
        76.586,39.614&reaspect=false&width=40&height=23&format=jpeg&SRS=EPSG:4326&styles=",  
      "DOWNLOAD_URL": "http://extract.cr.usgs.gov/axis2/services/DownloadService/initiateDow  
        nload?siz=172&key=N18&ras=1&pfm=GeoTIFF&imsurl=-1&ms=-1&att=-1&lay=-1&fid=-  
        1&dlpre=&lft=-76.6925&rgt=-  
        76.586&top=39.614&bot=39.551333333333&wmd=1&mur=http://extract.cr.usgs.gov/distmet  
        a/servlet/gov.usgs.edc.MetaBuilder&mcd=NAIP_Z18&mdf=HTML&arc=ZIP&sde=NAIP_WGS84_W  
        M_3BAND&msd=NAIP.naip_z18_plygn_meta&zun=null&prj=26918&rsp=0&bnd=&bndnm=&csx  
        =1.0&csy=1.0&ics=&ORIG=null"},  
      ...  
    ], "STATUS": true  
  }  
}
```

2.10 requestValidationService Tiled Request Example

This shows an example request for pre-packaged (Tiled) High Resolution Orthoimagery datasets.



The screenshot shows the "Web Services Test Client - Mozilla Firefox" window. The title bar has standard icons and menu options: File, Edit, View, History, Bookmarks, Tools, Help. The main window title is "Web Services Test Client". Below the title is a toolbar with a plus sign icon. The main area is titled "Inputs" in large bold letters. It contains several input fields with required values:

TOP: (required)	39.818
BOTTOM: (required)	39.792
LEFT: (required)	-105.033
RIGHT: (required)	-104.996
SPATIALREFERENCE_WKID:	
LAYER_IDS: (required)	HROT
CHUNK_SIZE:	
ORIGINATOR:	
JSON:	

At the bottom left are two buttons: "Invoke" and "Clear". At the bottom right is a "Done" button.

Here is a portion of the response that shows the download URLs that can be used in the Download Web Service to retrieve the individual pre-packaged data tiles containing the full-resolution data and the thumbnail URLs that can be used to display a downsampled preview image.

```
<REQUEST_SERVICE_RESPONSE>
<PIECE>
<DOWNLOAD_URL>http://extract.cr.usgs.gov/axis2/services/DownloadService/initiateDownload?
PL=HROT&MSU=http://imsref.cr.usgs.gov/servlet/com.esri.esrimap.Esrimap&MSS=USGS_EDC_Seamless
_Inventory&MSL=TDDS_INDEX&MSEA=FILE_ID&DLS=http://gisdata.usgs.net/TDDS/DownloadFile.php?
TYPE=ortho
%26FNAME=&FID=ZI&ARC=ZI&DLA=FILE_ID&EIDL=13SDE965040_200204_0x3000m_CL&siz=430&lft=-
105.040883606023&bot=39.7859409790733&rgt=-
105.023357490914&top=39.799461014857&ORIG=null</DOWNLOAD_URL>
<THUMBNAIL_URL>http://tdds.cr.usgs.gov/browse/ortho/13S/DE/13SDE965040_200204_0x3000
m_CL.jpg</THUMBNAIL_URL>
</PIECE>
<PIECE>
<DOWNLOAD_URL>http://extract.cr.usgs.gov/axis2/services/DownloadService/initiateDownload?
PL=HROT&MSU=http://imsref.cr.usgs.gov/servlet/com.esri.esrimap.Esrimap&MSS=USGS_EDC_Seamless
_Inventory&MSL=TDDS_INDEX&MSEA=FILE_ID&DLS=http://gisdata.usgs.net/TDDS/DownloadFile.php?
TYPE=ortho
%26FNAME=&FID=ZI&ARC=ZI&DLA=FILE_ID&EIDL=13SDE965040_200404_0x3000m_CL&siz=430&lft=-
105.040883606023&bot=39.7859409790733&rgt=-
105.023357490914&top=39.799461014857&ORIG=null</DOWNLOAD_URL>
<THUMBNAIL_URL>http://tdds.cr.usgs.gov/browse/ortho/13S/DE/13SDE965040_200404_0x3000
m_CL.jpg</THUMBNAIL_URL>
</PIECE>
...
</REQUEST_SERVICE_RESPONSE>
```